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Bowers, L., Nijman, H., Allen, T., **Simpson, A.**, Warren, J. & Turner, L. (2006) Prevention and management of aggression training and officially reported violent incidents: The Tompkins Acute Ward Study. *Psychiatric Services*, 57(7), 1022-1026.

## **Prevention and management of aggression training and officially reported violent incidents: The Tompkins Acute Ward Study**

**Objective:** Reports of violence, and injuries to both staff and patients, in acute psychiatric inpatient settings, have led to the development and implementation of training courses in the Prevention and Management of Violence and Aggression. The purpose of this study was to explore the relationship between the training of acute psychiatric ward nursing staff, and officially reported violent incident rates.

**Methods:** A retrospective analysis was conducted of training records (n = 312 course attendances) and violent incident rates (n = 684 incidents) over two and a half years on fourteen acute admission psychiatric wards (n = 5384 admissions) at three inner city hospitals.

**Results:** A positive association was found between training and violent incident rates. There was weak evidence that aggressive incident rates prompt course attendance, no evidence that course attendance reduces violence, and some evidence that update courses trigger small short term rises in rates of physical aggression. Course attendance was associated with a rise in physical and verbal aggression whilst staff were away from the ward.

**Conclusions:** The failure to find a drop in incident rates after training, coupled with the small increases detected, raises concerns over its efficacy as a preventative strategy. Alternatively the results are consistent with a threshold effect, indicating that

once adequate numbers of staff have been trained, further training maintains a low rate of incidents.

# **Prevention and management of aggression training and officially reported violent incidents: The Tompkins Acute Ward Study**

For some time there has been rising concern about patient violence on psychiatric wards. It has been estimated that nursing staff have a 10% risk of being subject to a physically violent attack during the course of one year (Healthcare Commission 2005). Although the majority of such attacks result in little or no physical injury, psychological responses can be significant, with reports of consequent anger, anxiety, post-traumatic stress disorder symptoms, guilt, self-blame and shame (Needham et al. 2005). There have been additional concerns about injuries to patients during the management of violent incidents, particularly manual restraint related deaths (Blofeld et al. 2003; Paterson et al. 2003).

These concerns have led to the development and implementation of courses for nursing staff on the Prevention and Management of Violence and Aggression (PMVA). In the UK, such courses originated within the prison system, and were then imported into general psychiatry, with modifications, via forensic psychiatric hospitals (Wright 1999). Such training is often referred to as 'Control and Restraint' and appears to be the dominant form of training in the UK, although many other types and variations are also in use. More recently, such courses have become mandatory

for UK psychiatric service providers (National Institute for Mental Health in England 2004).

There is little published data on the frequency of use of manual restraint in the UK, with one study (Duff, Gray, & Brostor 1996) suggesting eight times per year on an average ward in order to manage aggressive behaviour. The hospitals in which this study took place did not routinely collect information on manual restraint use, nor is it easy to distinguish manual restraint from lower level coercion (Ryan & Bowers 2005). Manual restraint is used throughout psychiatric services in the UK, seclusion is only used in 70% of acute wards nationally (Garcia et al. 2005), and mechanical restraint is not used at all.

The evaluation of PMVA courses has not been rigorous. There are no randomised controlled trials of manual restraint techniques (Sailas & Fenton 2005). A number of studies have shown that staff feel safer and more confident in dealing with aggressive situations following training (Beech & Leather 2004; Collins 1994; van Rixtel, Nijman, & Jansen 1997) however this is not the same as demonstrating that violent incidents are subsequently prevented or better managed. There is surprisingly little peer reviewed outcome data on the effects of training. Reductions in incident rates and injuries following the introduction of training courses have been reported by some (Carmel & Hunter 1990; Gertz 1980; Mortimer 1995; St. Thomas Psychiatric Hospital 1976). Others have reported no change in incident rates and an increase in injuries following the implementation of a course (Parkes 1996), or no reduction in incidents for staff who were trained, as compared to an untrained control group (van Rixtel, Nijman, & Jansen 1997). The most rigorous trial conducted so far found no

convincing impact of training on aggression frequency (Needham I. 2004;Needham et al. 2004). No previous study has used a longitudinal design to evaluate the outcome of PMVA training, although one provided graphs for one ward over a 31-month period, showing decreases in aggression frequency once a threshold of 60% of staff trained had been achieved (Mortimer 1995).

Data reported in this paper were gathered as part of the Tompkins Acute Ward Study, a longitudinal research project investigating care on acute psychiatric wards via qualitative and quantitative methods. The study aims to illuminate links between rates of conflict and containment, staff characteristics, and multidisciplinary relationships. The purpose of this paper is to explore the relationship between the delivery of PMVA training to acute psychiatric ward staff, and officially reported violent incident rates through retrospective analysis of official records.

## METHODS

### **Sample**

Data were drawn from official reporting systems of one psychiatric service provider in London UK. Fourteen acute psychiatric wards on three hospital sites were included in the sample. One was a female only ward, a second acted as an assessment ward, the remainder were mixed gender wards serving specific localities. The period covered by our data was from 2002 (week 14) to 2004 (week 45), approximately two and a half years.

## **Data collection**

Data on adverse incidents are routinely collected by nursing reports, which are entered on a proprietary computer system. We were provided with the dates and wards of all incidents falling into the following categories: verbal abuse, property damage, physical assault, self-harm, and absconding. One hospital only commenced using the proprietary incident recording system in 2003 (week 36), so for five wards in our sample this data is less comprehensive. The assessment ward closed in mid 2003. For the remaining 9 wards data covering the full study period was available.

PMVA training has been given to all acute psychiatric ward staff in the study district for many years. A team of two trainers provided the courses over the period of the study. Courses consisted of either a five-day foundation course, or a one-day annual update. The five-day course covered the prediction, anticipation and prevention of violence; reporting requirements; the role of personal, environmental and organisational factors in violence reduction; responses to aggression, involving de-escalation, communication skills, problem solving and negotiation; and the principles and practice of breakaway and manual restraint skills. Update courses covered manual restraint skills only. The current PMVA trainers made full training records for all wards, covering the full study period, available to us.

Permission to access and use these sources of data was provided by the NHS Trust managers and by the Local Research Ethics Committee. Hospital names have been anonymised.



## **Data analysis**

On receipt, data was screened for outliers and obvious errors, which were checked against other sources of information and corrected or removed. All data was then imported into a database program and collated using structured query language (SQL). The data was then exported as text files and imported into STATA 8 (Stata corporation 2003) for statistical analysis. The basic form of this data was incident and training counts by week by ward. Poisson regression was used, as this is particularly appropriate for the analysis of event counts over time. Two different time frames were applied: four-week periods, and weeks. Four-week periods smooth out daily and weekly variation due to other factors, and were used to assess relationships between variables over longer intervals of time. Weekly data were used to conduct a finer grained analysis of short term influences. The number of occupied bed days was used as the exposure, thus controlling for fluctuations in the numbers of patients present on the wards. The effect of incidents on training was assessed by regressing lags of incident rates on counts of staff training attendances (e.g. the numbers of physically aggressive incidents in one month was related to the following month's number of staff on training courses, etc.). A similar method was used to assess the effect of training on incidents (e.g. the number of course attendances in one month was related to the following month's number of verbally aggressive incidents, etc.). Following initial analysis, each least significant variable was then removed sequentially, until only significant variables were in the model. Adjusted r-squared values were calculated for each model, and incident rate ratios (IRR) provided as a guide to effect sizes.

## RESULTS

### **Incident rates and fluctuations over time**

Data on both aggressive incidents and PMVA training were available for a total of 1404 ward weeks. Mean weekly rates are shown in Table 1. During the study period there were 226 incidents of verbal aggression, 88 incidents of property damage, and 370 incidents of physical aggression; 144 ward staff attended 5-day PMVA courses, and 168 attended updates. These figures equate to roughly one incident of physical aggression per ward per four weeks, and one staff per ward attending a PMVA course every five weeks.

Chart 1 displays the frequency of all aggressive incidents for the three hospital sites. Refuge Hospital joined the central incident recording system in 2003, and incidents peaked in summer 2004 then declined. A similar peak occurred at Haven Hospital during late 2002, thereafter evening out at a random walk around a mean of one aggressive incident per week. Shelter Hospital seems to have a more fluctuating rate around a higher mean of two incidents per week. Overall there is no trend towards an increase or decrease in aggression over the study period.

### **Associations within four-week periods**

The relationship between training and aggression was explored by examining the association of aggression to training in the following months, and of training to aggression in the following months. This analysis was conducted for each type of violence and each type of course, using lags of one, two and three months.

With respect to aggression leading to course attendance, property damage in the preceding month ( $p = 0.021$ ,  $IRR = 1.38$ ), and physical violence during the month of the course ( $p = 0.03$ ,  $IRR = 1.16$ ) were associated with greater 5-day PMVA course attendance; and physical violence three months before ( $p = 0.012$ ,  $IRR = 0.78$ ) was associated with less course attendance (adj.  $r^2 = 0.029$ ). This means that for every one incident of property damage in the preceding month, there was an increase of 38% in course attendances, for every one incident of physical violence during the month of the course there were 16% more course attendances, and for every incident of physical violence three months before there were 22% fewer course attendances.

With respect to aggression leading to PMVA update course attendance, verbal aggression at one ( $p = 0.049$ ,  $IRR = 1.13$ ) and two ( $p = 0.003$ ,  $IRR = 1.20$ ) months before were associated with greater attendance; and property damage at one ( $p = 0.009$ ,  $IRR = 0.58$ ) and three ( $p = 0.015$ ,  $IRR = 0.60$ ) months before were associated with less attendance (adj.  $r^2 = 0.036$ ). These findings provide some limited support for the idea that aggression in the months prior to courses prompts greater attendance, but the pattern of results is inconsistent and therefore unconvincing.

Course attendance also had discernible effects upon incident rates in the following months. Greater physical aggression was associated with PMVA update course

attendance in the preceding month ( $p < 0.001$ ,  $IRR = 1.17$ ,  $adj. r^2 = 0.016$ ). Greater verbal aggression was associated with update course attendance two months before ( $p = 0.026$ ,  $IRR = 1.13$ ) and less verbal aggression with update course attendance the month before ( $p = 0.019$ ,  $IRR = 0.79$ ,  $adj. r^2 = 0.013$ ). There was no relationship between rates of property damage and previous course attendance. Again these results are inconsistent, and provide little support for the idea that course attendance leads to substantive decreases in aggression rates over several months.

### **Associations within weeks**

A similar analysis was therefore conducted at the level of ward weeks, exploring the relationships between aggression and courses using lags of one, two, three and four weeks. Greater PMVA 5-day course attendance was associated with physical violence three weeks before ( $p = 0.019$ ,  $IRR = 1.29$ ) and the week of the course ( $p < 0.001$ ,  $IRR = 1.43$ ,  $adj. r^2 = 0.018$ ).

With respect to aggression leading to PMVA update course attendance, verbal aggression four weeks before ( $p = 0.031$ ,  $IRR = 1.32$ ) and the week of the course ( $p = 0.011$ ,  $IRR = 1.33$ ) were associated with higher course attendances, and physical violence three weeks before ( $p = 0.023$ ,  $IRR = 0.65$ ) with lower attendance ( $adj. r^2 = 0.014$ ). Again, there were some indications of aggression prompting course attendance, but no consistent picture emerges. However what does stand out clearly is that 5-day course attendance has an opportunity cost, in that the withdrawal of regular staff from the wards on study leave seems to lead to an increase in physical violence.

The impact of course attendance on aggression in the following weeks is clearer. Greater physical aggression was associated with PMVA update course attendance three weeks ( $p = 0.04$ ,  $IRR = 1.17$ ) and four weeks ( $p = 0.019$ ,  $IRR = 1.20$ ) before, and with PMVA 5-day course attendance ( $p < 0.001$ ,  $IRR = 1.50$ ) in the same week (adj.  $r^2 = 0.012$ ). There was also a trend towards an association with update course attendance the week before. For verbal aggression, greater frequency was associated with 5-day ( $p = 0.042$ ,  $IRR = 1.34$ ) and update courses ( $p = 0.038$ ,  $IRR = 1.21$ ) in the same week (adj.  $r^2 = 0.005$ ). Rates of property damage had no relationship to previous course attendances. These findings suggest that PMVA update courses might precipitate a short-term increase in physical violence.

## **Summary**

This longitudinal dataset of official reports shows a positive association between PMVA training and violent incident rates. It provides weak evidence that aggressive incident rates prompt course attendance, no evidence that course attendance (either 5-day or updates) reduces violence in the short or long term, and some evidence that update courses trigger short term (four week) rises in rates of physical aggression. In addition, they show that course attendance leads to a significant rise in physical and verbal aggression on the ward whilst staff are away.

## **DISCUSSION**

Our data covering a period of nearly three years provide no indication that violent incident rates are rising. Steeply rising trends were reported in a comparable London hospital during the 1980s (Noble & Rodger 1989). Comparisons are not easy to make because of differences in ward types, but it would appear that had those trends continued, our data should have shown rates of two violent incidents per ward per week. Instead, the rate of incidents in our study was 0.26 per ward per week. There is little hard evidence that violent incidents in psychiatry are increasing in the UK.

The findings on the impact of training are an uncomfortable set of results. The authors had hoped to identify reductions in aggression following course attendance.

Theoretical thinking and previous work had suggested that greater technical mastery in the interpersonal management of aroused patients, coupled with a calm and confident demeanour on the part of staff, would together lead to more frequent resolution of tense situations without violence (Bowers 2002). Such training should have its greatest impact just after it has been completed, with its effect gradually attenuating thereafter. Instead the results point in the other direction, with update courses apparently triggering small rises in physical violence. In addition, course attendance takes staff away from the ward, stimulating more violence while they are away.

These results are based on officially reported data, indicating that they should be accepted with caution. Official data is subject to a number of different influences (for example the concerns of managers and the constant changes in policy in the UK health service). Official statistics on violence are also rather notorious for being a product of under-reporting (Lion, Snyder, & Merrill 1981). It is therefore possible that

the relationships we have found are a product of chance, or of course attendance stimulating an increase in reporting. However, if this was the case, verbal abuse and property damage should also show more rises after the course, and similar rises (possibly even larger) should occur after the 5-day course. Neither of these relationships was evident in our data.

Another potential explanation might be that these findings are a local product, and the local circumstances have produced anomalous results. Whilst PMVA courses in general elsewhere may produce the drop in incident rates we had anticipated, either the local content or teaching delivery may have led to the opposite effect. However we have no evidence or reason to believe this. The course content is fairly standard and the local trainers who deliver it are qualified, experienced and competent.

Alternatively, the effect may have been produced by the combination of the course with local service characteristics. The acute wards in this study suffer from staff shortages. Although data is not available for the whole period of the study, for most of 2004 the mean vacancy rate was 24%. This may explain the increase in incidents when staff were away on the PMVA training courses, on the grounds that any strain on this fragile staffing situation had negative consequences. Approximately 10% of all ward nursing staff study leave in the locality is for attendance on PMVA courses.

Vacancy rates may also have contributed in some way to the rise in incidents following updates courses. However we are unable to explain why this might happen, and why the effect is specific to update courses and not the 5-day courses as well.

The most positive gloss that can be placed on the failure to discover a drop in incident rates following training is that the culture of violence prevention in the locality is in a

steady state. Further training maintains a low level of violence, rather than lowering it from a high level. The discrepancy between our findings and those of some previous studies could thus be due to maximal impact on violent incident rates only occurring when training is first introduced. Violent incidents in the study district may have reduced some years before when PMVA training was first introduced, and stayed low as the training scheme continued. This interpretation would be supported by data showing sustained decreases in incident rates once a 60% threshold in PMVA trained staff had been achieved (Mortimer 1995). Alternatively, the early impact of training on aggression rates may be a 'Hawthorne Effect', due to novelty, and wear off in the longer term. The most negative interpretation is that training in the management of aggression makes staff more confident and more likely to confront patients, elicit a violent response and use the manual restraint techniques they have been taught (Morrison 1990). It may be that such a response only occurs with more superficial training, thus the rise in violence following update rather than 5-day courses. It is perhaps noteworthy that in the study district, update courses concentrate solely on violence management skills, and do not refresh participants' knowledge of violence prevention and de-escalation.

## CONCLUSIONS

The evidence regarding the efficacy of PMVA training in reducing aggression rates is finely balanced. Although some reported studies are positive, in most cases the methodologies used have not been highly rigorous, with nearly all being uncontrolled natural experiments. Assessing this evidence is complicated by variation in course



content, delivery and duration. Our results do raise questions about the necessity for annual updates, but further research is clearly required before any changes in policy are considered.

Even if such courses do not prevent aggression, they may still have value for the skills they teach in safe manual restraint techniques. However, there remains a paucity of evidence on outcome in terms of staff and patient injuries, as well as prevention. We clearly need to know more about the effect of differing course content, and identify what teaching does and does not lead to successful prevention, as well as management.

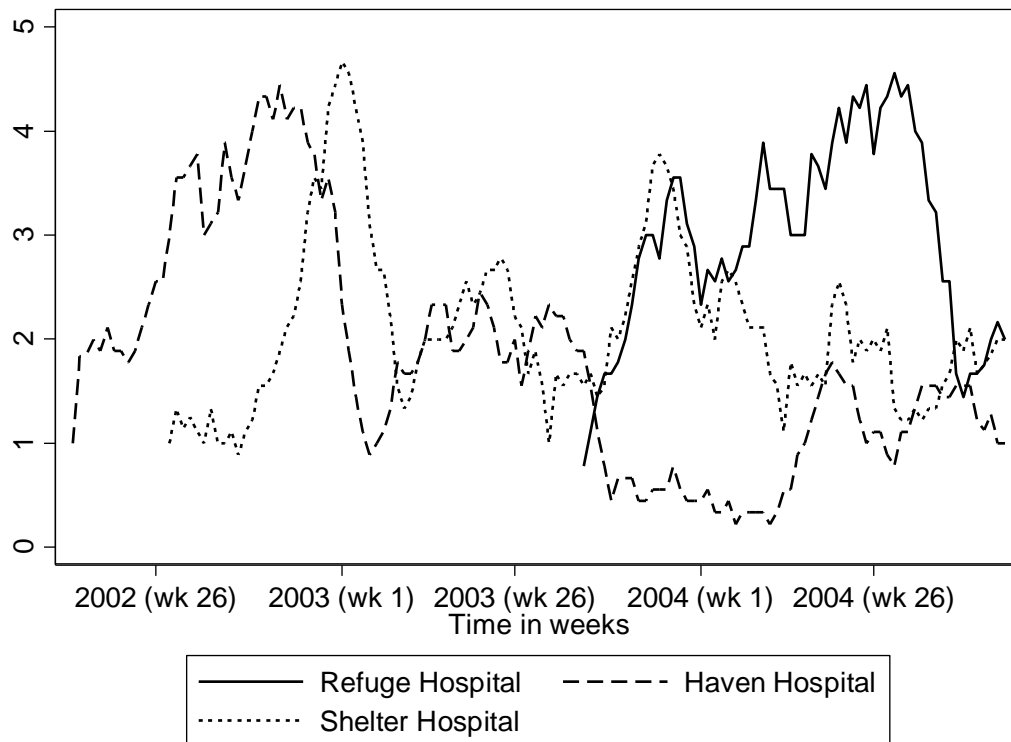
## ACKNOWLEDGEMENTS

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Table 1: Frequencies of aggressive incidents and PMVA course attendances

	<b>n</b>	<b>Mean</b>	<b>sd</b>
<b><i>Per ward per week</i></b>			
Verbal aggression frequency	1404	0.16	0.51
Property damage frequency	1404	0.06	0.28
Physical aggression frequency	1404	0.26	0.65
PMVA 5 day training attendance	1774	0.08	0.34
PMVA update attendance	1774	0.09	0.45
<b><i>Per 100 occupied bed days</i></b>			
Verbal aggression frequency	1326	0.13	0.41
Property damage frequency	1326	0.05	0.23
Physical aggression frequency	1326	0.22	0.56

Chart 1: Aggressive incidents in the three hospitals over time (8 week moving average)



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